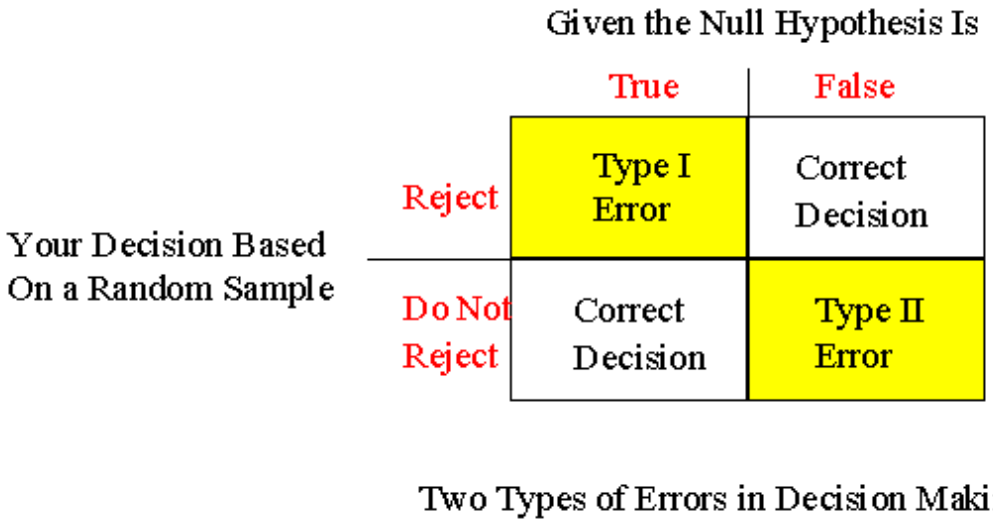
The Type-I and Type-II Errors in Business Statistics



Two Types of Errors in Decision Making

As indicated in the above matrix a Type-I error occurs when, based on your data, you reject the null hypothesis when in fact it is true. The probability of a type-I error is the level of significance of the test of hypothesis and is denoted by α.

Type-I error is often called the producer's risk that consumers reject a good product/service indicated by the null hypothesis. That is, a producer introduces a good product, in doing so, he/she take a risk that consumer will reject it.

A type II error occurs when you do not reject the null hypothesis when it is in fact false. The probability of a type-II error is denoted by β.
Type-II error is often called the consumer's risk for not rejecting possibly a worthless product or service indicated by the null hypothesis.

The foundation and logic of Statistics (i.e. Inferential Statistics):

Consider the test of hypothesis with Null Ho, verses a two-side alternative Ha, since the sample is random (i.e., unbiased) to get such a large (absolute) computed statistics under the null hypothesis is very rare (say α= 5%), however we got such a large statistics

surprisingly; the question is what is wrong here? Well, the only possibility is that your null hypothesis is wrong. That is why we reject the null hypothesis.

Since there is a duality between the test of hypothesis and estimation with confidence, the above logic is applicable to the estimation and construction of confidence interval.

- Confusion! Which one, Non-Rejection Region OR Non-Rejection Interval?

- Give two important applications of descriptive statistics, such as Histogram?

Three ways of doing statistical hypotheses:

1. Based on significance level (say α= 5%),
2. Based on P-value,
3. The hybrid of both

- What is the use of Standardize Z?

Among other useful questions, for example you may ask why we are interested in estimating the population's expected value μ and its Standard Deviation σ? Here are some applicable reasons. Business Statistics must provide justifiable answers to the following concerns for every consumer and producer:

1. What is your (or your customers) Expectation of the product/service you buy (or that your sell)? That is, what is a good estimate for μ ?
2. Given the information about your (or your customers) expectation, what is the Quality of the product/service you buy (or that you sell)? That is, what is a good estimate for σ ?
3. Given the information about what you buy (or your sell) expectation, and the quality of the product/service, how does the product/service compare with other existing similar types? That is, comparing several μs' and several σs'.
4. Finding any (linear) relationship for prediction purposes. For example, sales (S) as function of advertising rate (A) for a specific budget and duration of campaign (T). That is, estimation of S = mA + b.